

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

C. Amendments to the Claims.

1. (Cancelled) A semiconductor apparatus, comprising:

5 a plurality of device elements formed on a surface of a semiconductor substrate, each device element having a diffusion region;

a multi-layer wiring configuration electrically connecting at least two of the diffusion regions, the multi-layer wiring configuration containing a plurality of wiring layers, a first one of the plurality of wiring layers being divided into a first wiring region for providing wiring in a first direction and a second wiring region for providing wiring in a second direction; and

10 predetermined wiring in the first one of the plurality of wiring layers is electrically connected to and disposed in parallel with wiring in a second one of the plurality of wiring layers.

15 2. (Cancelled) The semiconductor apparatus according to claim 1, wherein the first direction is orthogonal to the second direction

3. (Previously Amended) A semiconductor apparatus, comprising:

20 a plurality of device elements formed on a surface of a semiconductor substrate, each device element having a diffusion region;

a multi-layer wiring configuration electrically connecting at least two of the diffusion regions, the multi-layer wiring configuration containing a plurality of wiring layers, a first one of the plurality of wiring layers being divided into a first wiring region for providing wiring in a first direction and a second wiring region for providing wiring in a second direction; and

25 predetermined wiring in the first one of the plurality of wiring layers is electrically connected to and disposed in parallel with wiring in a second one of the plurality of wiring layers; wherein

the first direction is orthogonal to the second direction; and

30 the second one of the plurality of wiring layers has a higher sheet resistance than the first one of the plurality of wiring layers.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

4. (Previously Amended) The semiconductor apparatus according to claim 3, wherein the first one of the plurality of wiring layers includes:

5 a first wiring trace in the second wiring region disposed in the second direction;

a second wiring trace in the second wiring region disposed in the second direction and separated from the first wiring trace in the first direction; and

a third wiring trace in the first wiring region disposed in the first direction and electrically connecting the first wiring trace and the second wiring trace.

10 5. (Currently Amended) The semiconductor apparatus according to claim 3, further including:

~~the multi-layer wiring configuration includes a second one of the plurality of wiring layers;~~

15 a memory array having bit lines formed with bit line wiring layers of the same material as the second one of the plurality of wiring layers; ~~and~~

~~the second one of the plurality of wiring layers has a higher sheet resistance than the first one of the plurality of wiring layers.~~

20 6. (Original) The semiconductor apparatus according to claim 5, wherein the memory array has dynamic random access memory cells having a capacitor over bit line structure.

7. (Cancelled) A semiconductor apparatus, comprising:

25 a plurality of functional circuit blocks disposed in a matrix on the surface of a semiconductor substrate, each functional circuit block including a plurality of device elements, a first wiring region and a second wiring region; and

30 a multi-layer wiring configuration containing a plurality of wiring layers for electrically connecting predetermined ones of the device elements, the multi-layer wiring configuration including a first one of the plurality of wiring layers disposed in the first wiring region providing first wiring in a first direction and the first one of the plurality of wiring layers disposed in the second wiring region providing second wiring in a second direction.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

8. (Cancelled) The semiconductor apparatus according to claim 7, wherein the first direction is orthogonal to the second direction.

5 9. (Currently Amended) A semiconductor apparatus, comprising:

a plurality of functional circuit blocks disposed in a matrix on the surface of a semiconductor substrate, each functional circuit block including a plurality of device elements, a first wiring region and a second wiring region; and

10 a multi-layer wiring configuration containing a plurality of wiring layers for electrically connecting predetermined ones of the device elements, the multi-layer wiring configuration including a first one of the plurality of wiring layers disposed in the first wiring region providing first wiring in a first direction and the first one of the plurality of wiring layers disposed in the second wiring region providing second wiring in a second direction; wherein

15 the first direction is orthogonal to the second direction;

a predetermined first portion of the first one of the plurality of wiring layers is electrically connected to and disposed in parallel with wiring in a second one of the plurality of wiring layers ~~of the plurality of wiring layers~~; and

20 the second one of the plurality of wiring layers has a higher sheet resistance than the first one of the plurality of wiring layers.

10. (Previously Amended) The semiconductor apparatus according to claim 9, wherein the second one of the plurality of wiring layers has a higher melting point than the first one of the plurality of wiring layers.

25

11. (Cancelled) The semiconductor apparatus of claim 8, wherein the plurality of functional circuit blocks are disposed in a matrix on the surface of a semiconductor substrate.

12. (Currently Amended) The semiconductor apparatus of claim 9, further including:

30 ~~the multi-layer wiring configuration includes a second one of the plurality of wiring layers;~~

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

a memory array having bit lines formed with bit line wiring layers of the same material as the second one of the plurality of wiring layers; ~~and~~

~~the second one of the plurality of wiring layers has a higher sheet resistance than the first one of the plurality of wiring layers.~~

5

13. (Cancelled) The semiconductor apparatus of claim 8, wherein the device elements are insulated gate field effect transistors (IGFETs), each IGFET having a source/drain diffusion region and the multi-layer wiring structure electrically connects a source/drain region of at least two IGFETs within a functional circuit block by using the first one of the plurality of wiring
10 layers in the first wiring region and the second wiring region.

14. (Withdrawn) A method for forming a semiconductor apparatus by electrically connecting functional blocks with a multi-layer wiring configuration containing a plurality of wiring layers and each functional block includes a plurality of device elements, comprising the steps of:

15 forming a diffusion layer associated with device elements on the surface of the substrate;

forming a first interlayer film;

forming a first wiring layer to produce electrodes electrically connected to the diffusion layer;

20 forming a second insulation film; and

forming a second wiring layer wherein for each functional block a first wiring region provides electrical connections using the second wiring layer in a first direction only and a second wiring region provides electrical connections using the second wiring layer in a second direction only thereby providing
25 electrical connections between at least two device elements with the second wiring layer through the electrodes produced by the first wiring layer.

15. (Withdrawn) The method according to claim 14, wherein the first direction is orthogonal to the second direction.

30

16. (Withdrawn) The method according to claim 15, wherein the first wiring layer has a higher

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

sheet resistance than the second wiring layer.

17. (Withdrawn) The method according to claim 15, wherein at least a portion of the wiring formed by the second wiring layer in the first wiring region is disposed in parallel and
5 electrically connected to wiring formed by the first wiring layer producing the electrodes.

18. (Withdrawn) The method according to claim 15, wherein the plurality of functional blocks are disposed in a matrix on the surface of a semiconductor substrate.

10 19. (Withdrawn) The method according to claim 15, wherein the step of forming the first wiring layer also forms bit lines in a semiconductor memory array.

20. (Withdrawn) The method according to claim 19, wherein memory cells in the semiconductor memory array are DRAM cells having a capacitor over bit line structure and the first wiring layer
15 has a higher melting point than the second wiring layer.